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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/061,216	02/04/2002	Gregory P. Pogue	43276	3510

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EXAMINER	
FOLEY, SHANON A	
ART UNIT	PAPER NUMBER
1648	

DATE MAILED: 12/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/061,216	POGUE ET AL.	
	Examiner	Art Unit	
	Shanon Foley	1648	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 September 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *70 and 79-87* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *70 and 79-87* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/25/4*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 82-84 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 82 recites the limitation "said heating step" in lines 1-2.

Claim 83 recites the limitation "said cooling step" in lines 1-2.

Claim 84 recites the limitation "said centrifugation step" in lines 1-2.

There is insufficient antecedent basis for these limitations in the claims. In the interest of compact prosecution, the claims will be examined as if it depends from claim 79. However, this treatment does not relieve applicant of the burden of remedying this rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 70 and 79-87 are rejected under 35 U.S.C. 103(a) as being unpatentable over Garger et al. (US 6,033,895), (US 6,037,456), (US 6,303,779 B1) or (US 6,740,740 B2), each in the alternative, Koprowski et al. (US 6,042,832) and Francon et al. (US 5,075,110).

Claims 70 and 79-84 are drawn to a method of isolating a virus by homogenizing virus-containing plant tissue in $Na_2S_2O_5$, straining the homogenate to obtain green juice, adjusting the pH of the green juice to 5.0 with acid, heating the green juice to about 47° C for about 5 minutes followed by cooling for about 5 minutes or to about 5° or 15° C, centrifuging the green juice at about 6000 x g for about 3 minutes, precipitating the supernatant in polyethylene glycol and NaCl to obtain a precipitate, resuspending the precipitate in water at a concentration of about 1 mg pr ml, extracting the precipitate in chloroform and butanol and centrifuging the extract, recovering and lyophilizing the aqueous phase of the centrifuged material and resuspending the lyophilized material at a concentration of about 5 to about 10 mg per ml of water.

Garger et al. teach a method of isolating a virus by:

- homogenizing virus-containing plant tissue in $Na_2S_2O_5$, see column 6, lines 7-10.
- straining the homogenate to obtain green juice, see column 5, line 64 to column 6, line 7.
- adjusting the pH of the green juice to 5.0 with acid and heating the green juice to about 47° C for about 5 minutes, see column 6, lines 14-36 and claims 1-3, 11 and 17.
- followed by cooling to about 5° C, see column 12, lines 43-45. Since the instant disclosure does not specifically define what is intended by "about 5° C" and the green juice is cooled to 15° C in the working example on page 17, it is determined that 15° C is equivalent to "about 5° C" instantly recited.
- centrifuging the green juice at about 6000 x g for about 3 minutes, see column 6, lines 63-66.
- precipitating the supernatant in polyethylene glycol, see column 12, lines 51-54 and claim 6.

Garger et al. do not teach precipitating the supernatant in a mixture of polyethylene glycol and NaCl. However, Koprowski et al. teach precipitating virus particles with a mixture of polyethylene glycol and NaCl from supernatant obtained from tobacco leaves, see column 12, lines 58-62. One of ordinary skill in the art at the time the invention was made would have been motivated to precipitate virus particles from plant supernatants with conventional PEG buffers with a reasonable expectation of success, absent evidence to the contrary.

- resuspending the precipitate in water at a concentration of about 1 mg per ml.

Although Garger et al. do not teach resuspending the precipitate in water, the reference specifically teaches that virus is recoverable after PEG treatment, see column 12, lines 51-54. Therefore, resuspending the product at a suitable concentration would have been prima facie obvious to one of ordinary skill in the art, absent unexpected results to the contrary.

- extracting the precipitate in chloroform and butanol and centrifuging the extract,

Garger et al. teach conventional methods of separation of viruses and proteins from plants include butanol and chloroform, see column 3, lines 47-53. One of ordinary skill in the art at the time the invention was made would have been motivated to use conventional methods of purifying viruses from plants by conventional means. One of ordinary skill would have had a reasonable expectation of success for purifying viruses from plants with chloroform and butanol because Garger et al. teach that this technique is useful and effective for small-scale virus purification.

The extraction method of Garger et al. is also found in Figure 1, column 7, line 39 to column 9, line 17, examples 2-5 bridging columns 12-16 and examples 8-11 bridging columns 18-22.

The instant claims additionally recite the following steps:

- recovering and lyophilizing the aqueous phase of the centrifuged material and
- resuspending the lyophilized material at a concentration of about 5 to about 10 mg per ml of water.

Garger et al. do not teach lyophilizing the virus. However, one of ordinary skill would have been motivated to lyophilize viruses because Francon et al. teach that lyophilizing viruses protects them and extends their preservation, see column 1, lines 10-16. One of ordinary skill in the art at the time the invention was made would have had a reasonable expectation of success for combining the teachings of Garger et al. with the lyophilization technique of Francon et al. because Garger et al. teach purifying virus and Francon et al. encompass the lyophilization of any purified virus, see claim 1. Therefore, the invention as a whole would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made, absent unexpected results to the contrary.

Response to Arguments

Applicant argues that neither Garger et al. patent teach or suggest using a solvent of any sort on a purified virus product. Applicant asserts that the solvent passages referred to in the Office action are described by another reference, Gooding et al. and that that Office is asserting that the protocol described by Gooding et al. would have been obvious for use in the protocols of Garger et al.

Applicant is correct in assessing the Office's assertion. The protocol of Gooding et al. is incorporated into the disclosure of Garger et al., see column 3, lines 22-25. Therefore, the teachings of Gooding et al., characterized by Garger et al. as "[t]he basic process for isolating virus particles" in column 3, lines 22-25, is also a teaching by Garger et al.

Applicant states that Garger et al. do not use an organic solvent and criticize the use of solvents as impractical for virus purification. Applicant points to column 3, lines 52-53 and column 9, lines 56-.

Applicant's arguments and a review of the reference have been fully considered, but are found unpersuasive. In the passages cited by applicant, Garger et al. are criticizing the practicality of using organic solvents for large-scale virus purification. Garger et al. do not teach away or imply negative effects attributed from using the solvents to purify virus. The instant claims do not specify whether the virus isolation protocol is for large-scale or small-scale purification. Since Garger et al. specifically state that the protocol described by Gooding et al., which uses solvents, is the basic protocol for isolating and purifying virus, it is maintained that it would have been prima facie obvious for one of ordinary skill to utilize standard protocols of virus isolation known in the art.

Applicant asserts that if one skilled in the art were to combine the solvent extraction by Gooding et al. with the protocol of Garger et al., one would obtain a different product since the solvent would have to be added in the protocol of Garger et al. before virus precipitation with PEG.

Applicant's arguments have been sully considered, but are found unpersuasive. It is not clear where Garger et al. suggest application of the solvent solely before virus precipitation with PEG. Garger et al. teach that the use of solvents, such as n-butanol, eliminate host related materials, see column 3, lines 47-51. In the instant claims, the PEG mixture is added to the supernatant from the centrifuged green juice, which results in a precipitate. In the virus purification art, separating or decanting supernatant from a pellet may result in a few impure

particles from the pellet, such as host material, within the supernatant. One of ordinary skill would be motivated to ensure that the PEG precipitate contains no host material by adding a solvent that is conventionally used to eliminate contaminates from the virus suspension to obtain a pure suspension for ultimate recovery.

Applicant states that the instant application uses organic solvents in the final steps and not for early extraction. However, since removing unwanted host debris from the desired product is known to be accomplished by solvents, the ordinary artisan would have applied solvents at any step where unwanted host material might be present.

Applicant also states that none of the references cited previously teach or suggest a solution comprising PEG and NaCl.

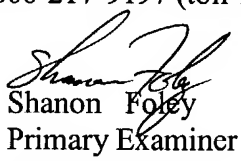
Upon review of the previous references cited, it is determined that applicant is correct. However, further consideration of the prior art revealed precipitating virus particles with the instant PEG mixture from plant material in teachings of Koprowski et al.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shanon Foley whose telephone number is (571) 272-0898. The examiner can normally be reached on M-F 10:00 AM - 6:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Housel can be reached on (571) 272-0902. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Shanon Foley
Primary Examiner
Art Unit 1648